DOCUMENT RESUME

ED 218 148 SE 038 273

AUTHOR Petrock, Edith M.
TITLE Energy Education: Why, What, Why and How?
INSTITUTION Education Commission of the States, Denver, Colo.
PUB DATE 30 Mar 82
NOTE 16p.; Paper presented at the National Association of Elementary School Principals Convention (Atlanta, GA, March 30, 1982). For a related document, see ED 211 347.

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Curriculum Development; *Educational Trends; Elementary Education; *Elementary School Curriculum; *Energy; *Guidelines; *Program Implementation; *Relevance (Education)
IDENTIFIERS *Energy Education

ABSTRACT

Four general issues concerning energy education are addressed: 1) why energy education has emerged as an identifiable curricular component; 2) what is happening to energy education today; 3) why energy education is still important; and 4) how energy education programs can be promoted in the classroom. A list of six objectives to be considered in developing comprehensive energy education programs is included. Specific guidelines are also offered to elementary school principals to promote energy education programs in their schools, suggesting that principals become "energy literate", maintain a long-range perspective, realize the importance of energy programs in the total school curriculum, and participate in the political process. Five implementation guidelines described in the publication "Energy Education: Why, What, and How" are summarized, focusing on cost-effectiveness, curricular considerations, objectivity, relevance, and teacher preparation/participation. (Author/JN)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Colette M. Patrick

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

This document has been reproduced as received from the person or organization originating it.

Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

ED218148

ENERGY EDUCATION: WHY, WHAT, WHY AND HOW?

National Association of Elementary School Principals Convention
March 30, 1982

When I was initially invited to address this General Assembly on energy education, I planned to talk about why energy education is important, what energy education is and how programs can be implemented at relatively low cost. However, since that time, we have all felt the effects of changing energy and educational policies and of fiscal constraints at virtually all levels of government. I would be remiss today is I did not acknowledge the impact of recent events on energy education. Although I tried incorporating this information into the original title, "Energy Education: Why, What and How?", I found that I had to insert an extra "Why," making the revised title "Energy Education: Why, What, Why and How?". The four questions I will answer are the following:

1. Why did energy education emerge as an identifiable curricular component?

2. What is happening to energy education today?

3. Why is energy education still important? and

4. How can we promote energy education in the classroom?

I. WHY DO WE HAVE ENERGY EDUCATION?

Energy is not a newcomer to the elementary/secondary instructional program; it is not a passing fad. Energy sources, forms, states and uses have traditionally been part of the science curriculum at virtually all grade levels. Social studies classes have discussed energy in many contexts, including the evolution of civilization, the industrial revolution, comparative lifestyles and current events.

During the 1960's -- when we witnessed a renewed awareness of man's relationship to the environment -- understanding, preserving and enhancing environmental quality became a mission of the schools. Energy development, distribution and utilization patterns were integral components of environmental education, which also tended to be implemented through science and social studies programs. The 1973-74 OPEC oil embargo added economics and international politics to the already extensive list of energy-related teachings to be incorporated into the curriculum.

Together, the events of the 1960's and mid-1970's caused a shift in the way we dealt with energy in the schools: it evolved from a multi-faceted area of interest to a complex area of concern. In other

SE038273

words, it became "relevant," which, as you know, can be the kiss of death. And, in the process of becoming relevant, energy education acquired a name and a mission. No longer could we take pride in America's ability to turn huge quantities of low-cost fossil fuels into continuous economic prosperity and growth. Suddenly, energy scarcity, escalating prices, environmental degradation and an awareness of the political implications of depending upon foreign oil producers all contributed to our sense of energy as a "crisis" in need of resolution.

When we face a national crisis, we expect three things to happen: First, federal and state governments must take action, they must design new policies, develop new programs and create a new beauracracy to implement these policies and programs. Second, the private sector is to respond with enlightened self-interest, offering information and services that meet public needs while enhancing corporate images. Third, the nation's schools are expected to add new information to the curriculum and/or emphasize existing coverage so that students will understand the issue in all of its complexity and be able to cope with the associated problems now and in the future.

And, lo and behold, all three expectations were fulfilled. The federal government responded by creating the U.S. Department of Energy, charged with developing a national energy policy and a variety of programs to promote energy awareness, conservation and national independence. In addition, an Energy and Education Action Center was created within what was then the U.S. Office of Education. State energy offices were formed, largely with federal funding, to collect and disseminate state-specific information and implement a combination of federal and state programs. Private initiatives included public information programs, provided by utility and other energy-related companies, and the development of energy education materials and conservation devices. The education sector responded both as a provider of information and as an energy consumer. State and local education agencies developed policies, offered energy-related inservice opportunities, and developed a variety of instructional programs at all grade levels. Individual teachers and administrators created and offered energy learning activities to meet student needs. Schools, as energy users, were caught unable to meet escalating energy costs and unable to cope with unpredictable supplies. Therefore, energy conservation programs became a management necessity, and implementing such programs often provided additional educational opportunities for school administrators, instructional and non-instructional personnel, students and community members.

In February of 1974, a research brief published by the Education Commission of the States (ECS) documented the education establishment's response to the energy crisis created by the OPEC embargo. Already, new programs stressing energy conservation and an awareness of our energy-related dilemmas had been developed and implemented by a significant number of states scattered throughout the nation.[1]

Energy became such an important issue that the National Assessment of Educational Progress conducted a special assessment of young adults' energy knowledge and attitudes in 1977.[2] Also in 1977, ECS Commissioners officially identified Energy and Environment as a priority issue category, directing staff to provide appropriate information and assistance to the states.

The next year, when ECS surveyed governors' offices, state legislatures, state departments of education and state energy offices, we found that most state departments of education and most state energy offices had assigned a person (not necessarily full-time) to be responsible for energy education. Furthermore, many agencies had adopted policies, rules, recommendations or guidelines regarding elementary/secondary energy education, generally through means of infusion into existing areas of instruction.[3] In 1978 the greatest problem seemed to be coordinating involved agencies and persons.

To meet this need, in 1979 ECS convened officials responsible for curricular policy and school plant management from state education agencies and energy offices for the purpose of stimulating intra- and interstate communication and cooperation. As an indication of interest, over forty states utilized their own funds to participate in this first Interstate Energy and Education Network Conference.[4] And, as a result of the meeting, ten regional networks were formed, corresponding with the ten federal regions. In the same year, the National Science Teachers Association began its annual practitioners conferences to enable teachers and instructional leaders to expand their knowledge of energy education and to facilitate sharing of programs, materials and expertise.

However, while many federal, state and local educators and political officials were demonstrating a commitment to curb our energy dependence, control energy costs and create an energy-literate society, others were becoming part of the growing number of Americans denying the existence of energy as a continuing problem. This sense of complacency leads us to the second question: "What Is Happening to Energy Education Today?"

II. WHAT IS HAPPENING TO ENERGY EDUCATION TODAY?

By mid-1974 the oil embargo was over, and many Americans believed that the energy crisis had ended. Reminding us of our dependence upon relatively unstable middle eastern political regimes for half of our energy supply became an unpopular priority of the Carter Administration. Public opinion polls conducted during 1977 and 1978 indicated that American citizens were not very concerned about energy-related problems,[5] and data from the National Assessment of Educational Progress confirmed that young adults (aged 26-35) were poorly informed about energy.[6] While the 1979

Iranian revolution temporarily shook Americans from their complacency, our ability to replace Iranian oil with other sources and our willingness to pay higher and higher prices again led to a lessening of concern. However, higher costs and the memory of shortages did motivate some behaviorial changes. Whether or not polls showed a preoccupation with energy as a national issue, people had taken conservation measures to lessen the budgetary impact of escalating prices. This curtailment in turn reduced our oil imports from one-half to approximately one-third of our petroleum consumption. And, the current economic recession has helped sustain this reduction.

People who were still worrying about energy found relief this November in Harper's cover story that unequivocally proclaimed, "The Energy Crisis Is Over!" In this article, William Tucker explained that,

> We have ended OPEC's dominance of the market within a few short months by swallowing what turned out to be a relatively mild pill and accepting a market price for our own oil. All we have to do now is decontrol our natural-gas prices, and we will be home free. There will be another mild period of adjustment, and soon we will be on a firm, stable, and innovative energy course.[7]

Whether or not one agrees with Tucker's analysis, the fact remains that the recent decline in world oil consumption has lessened OPEC's control over the market. In an effort to hold to the group's $34 a barrel benchmark ceiling price, OPEC ministers agreed last week to lower production ceilings by about 700,000 barrels a day, reducing the cartel's total daily output to 17.5 million barrels a day. (This compares to 31 million barrels a day produced by OPEC just 3 years ago.) Meanwhile, some member nations are undercutting the $34 figure, and some non-OPEC prices are substantially lower. (For example, three weeks ago Great Britian lowered the price of its North Sea crude to $31 a barrel.) However, the duration of current petroleum market conditions remains to be seen.

Current federal philosophy mirrors the widespread contention that energy is no longer a crisis. This belief is being justified by the assumption that unfettered market forces will balance energy supply and demand at appropriate prices which, in turn, will stimulate domestic production of apparently unlimited energy resources. Revised attitudes toward pricing have been accompanied by revised policies concerning energy independence. As stated in the "reformulated energy-policy guidelines" that the Administration presented to Congress last July, "Achieving a low level of U.S. imports at any cost is not a major criterion for the nation's energy security and economic health."[8]

Even without this philosophical change, efforts to curb federal spending necessitate a reduction in both energy and education

expenditures. The combination of fiscal and programmatic shifts accounts for proposals to eliminate both DOE's, that is, energy and education, and to replace some of the current categorical programs with "block grants," characterized by fewer strings and less money.

With respect to energy activities in the U.S. Department of Education, the Energy and Education Action Center, previously within the Office of School Improvement, was eliminated on February 12, 1982. So, as of this date, that Department no longer has any involvement in energy whatsoever. The highly touted block grants will not be a significant factor in supporting energy-related programs for two reasons: First, energy will be one of many competing uses for these limited funds. Department officials expect that most block grant money will be used to improve basic skills and to continue programs previously funded through Emergency School Aid appropriations, such as magnet schools. Second, the level of available funding is quite limited: amounting to approximately $7 per pupil at the local level. Because 65% of the 16,000 U.S. school districts have fewer than 3,000 pupils, most LEAs will receive less than $21,000, the equivalent of one staff position. Analysts predict that districts will allocate this money for a staff specialist in a core subject or for updated education materials. The remaining activities within the Department of Education would be transferred to a newly created education foundation if Congress approves the Administration's proposal.

The education and training programs previously supported by the U.S. Department of Energy have been zeroed out of the FY '83 budget. If one includes the printing and distribution of curricular materials, these programs were funded at 5 million dollars for FY '81 and 1.7 million dollars during the current fiscal year, FY '82. Other education-related programs within DOE also zeroed out for FY '83 include pre-freshman engineering support for women and minorities, the graduate traineeship program for engineers and the Schools and Hospitals program. With respect to the Department of Energy itself, the President has proposed that the Department of Commerce take over programs related to weapons, research and development. The strategic petroleum reserve and power administrations will be transferred to the Department of Interior, and some remaining programs will be placed in a new agency, to be named the Energy Research and Technology Administration. In other words, back to something like the ERDA (Energy Research and Development Administration) days, before our elusive encounter with the "moral equivalent of war." As with Department of Education, the actual outcome of course will depend on Congressional action. Such changes require new legislation, and there is considerable opposition to the abolishment of the Department of Energy. Meanwhile, however, dismantlement is occurring through the budgetary process.

While the final fate of proposed federal reorganizations and spending reductions for both energy and education programs are not yet known, two things are already clear: First, substantially less federal money will be available for energy, education, and their intersection. Second, state and local funds will not fill the gaps left by federal

austerity. For a myriad of reasons, including recession, spending ceilings, taxing limitations and the accumulation of already postponed public capital investments, state and local units of government are also facing fiscal crisis, and other priorities will successfully compete with energy education for scarce dollars.[9]

When the general public and its political officials feel that energy is no longer a crisis, then energy education automatically becomes less important. People seem to lose sight of the profound changes we still face with respect to energy costs, development of traditional and emerging energy sources, and the social and environmental implications of the changes in our energy-use patterns. In the education arena, public opinion has now turned its attention to other issues of education quality. Are students learning as much as they can learn and are they able to function at acceptable levels of competency in such basic areas as reading, writing, computing, and speaking? Are teachers adequately trained and properly monitored? If, indeed, state education agencies and local school districts are facing a fiscal crunch, obviously resources will be focused on those areas considered to be most important, and topics considered less important will suffer.

The impact on energy education of these changing priorities has been profound at all levels of government: federal, state and local. There has been a rapid drop in the number of persons having assigned responsibility for energy education, and many of those remaining are unsure of their tenure. People who are still responsible for providing energy education in the schools are faced with an end to the free distribution of energy education materials from the federal government.

Perhaps the most notable exception to this pervasive constriction in energy education is the growing interest and involvement of the private sector. To the extent that private involvement in energy education occurs without undue bias and/or is balanced with different perspectives, then this trend can be considered a hopeful sign. However, industry-sponsored materials tend to address industry concerns and activities. In the energy field this means that materials tend to focus on single energy sources: petroleum, gas, coal, nuclear, electric or solar. Under these circumstances, developing a comprehensive energy education program requires careful planning and synthesis.

I'll next discuss reasons why we must sustain our energy-related efforts, answering the 3rd question.

III. WHY IS ENERGY EDUCATION STILL IMPORTANT?

While the current situation of petroleum availability and declining prices has lulled many into a sense of security, energy analysts are warning us of the likelihood of a new energy crisis during the 1980's. Most recently joining these prognosticators

are Charles Ebinger and Richard Kessler, authors of a two-year study released this month by Georgetown University's rather conservative Center for Strategic and International Studies. The report predicts that another oil shortage will result from such likely factors as the following:

- o an end to the current recession;
- o a curtailment of conversions from oil to coal and other energy sources, partially due to the elimination of some federal incentives;
- o a reversal of Eastern Europe's energy exporting status; and
- o skyrocketing demand for oil by Third World countries and by OPEC members who, by the way, predict their consumption will grow from 2.4 MBD (million barrels per day) in 1980 to 6.3 MBD in 1990, significantly reducing the quantity of petroleum available for exportation.

In spite of the Center's close ties to the Reagan Administration, the authors contend that the current federal de-emphasis of the energy issue is "a prescription for disaster."[10] This conclusion substantiates a report released in September by the General Accounting Office (GAO) entitled, "The United States Remains Unprepared for Oil Import Disruptions." According to this earlier report, the nation is no more able to cope with a major oil cutoff than it was in 1973/74, in spite of having had eight years since the OPEC embargo to reflect and to plan. The GAO attributes our vulnerability to two related factors: first, "the Department of Energy has never mounted an adequate contingency planning effort," and second, "the executive has never given emergency preparedness the priority and attention it deserves."

While evaluations of our energy status have tended to focus on petroleum, it is important to emphasize a fact too often forgotten: our energy policy issues are not limited to this one energy source. Rising natural gas and electricity prices are causing severe economic repercussions among many segments of society, including the schools. With respect to alternate energy sources, people are still polarized by controversey over nuclear safety and are confused by conflicting claims over the potential costs and benefits of various forms of solar energy.

In completing my answer to the question, "Why is energy education still important?" I'd like to quote from a booklet entitled Energy Education: A Policy Development Handbook. This publication grew out of the work of our State Energy Education Project, funded by the U.S. Department of Energy and assisted by a national task force composed of educators, energy experts and political officials, chaired by Governor Richard Lamm of Colorado. The handbook justifies energy education in the following manner:

> Meeting the multi-faceted challenge that the energy transition presents requires an informed citizenry capable of making responsible decisions about the development and use of alternative energy supplies having various economic, political, social and environmental consequences. Such a requirement suggests that energy be considered a basic theme throughout the formal (in-school) and informal (out-of-school) education systems, as energy issues are immediate, serious and pervasive.[11]

With the help of our task force, we developed a list of six objectives to be considered in developing a comprehensive energy education program designed to fulfill this societal need .[12] They are the following:

Objective 1. To enable people to understand the nature and importance of energy.

Objective 2. To provide information about changing supply and demand factors for various energy sources.

Objective 3. To prepare people to consider the local, regional, national and international implications of different energy sources.

Objective 4. To provide information about conservation.

Objective 5. To prepare people to make personal and societal decisions related to energy supply disruptions.

Objective 6. To prepare people for energy-related careers and to become energy conscious in other career fields.

Assuming that we are convinced that energy education remains a necessary curricular component, our next -- and perhaps most important -- question remains to be answered.

IV. HOW CAN ELEMENTARY SCHOOL PRINCIPALS BEST PROMOTE ENERGY EDUCATION IN THE CLASSROOM?

To the best of my knowledge, no research has been conducted specifically related to the principal's role in energy education. Therefore, I am taking the liberty of borrowing from research findings about factors responsible for effective schools. Most of this research has focused on accounting for differences in basic skills achievement among schools having similar student bodies. According to the conclusions made by Ronald Edmonds of the Harvard University Graduate School of Education, five factors seem to be associated with higher average scores on standardized achievement tests. They are the following:

1. Strong administrative leadership by the school principal, particularly with respect to instructional matters.

2. A safe and orderly school climate, relatively free of discipline and vandalism problems.

3. Schoolwide emphasis on teaching basic skills.

4. Teacher expectations that all students can achieve appropriate levels of skill.

5. A system for monitoring and assessing student achievement that is closely related to instructional objectives.[13]

Assuming that these research findings are applicable to a broad spectrum of curricular objectives, then the school principal plays a key role as both an instructional leader and an organizational manager who sets standards for school climate and teacher-pupil attitudes.

Beyond these general guidelines, however, there are some specific things that you can do to promote energy education in your school building.

First, Become Energy Literate.

Educate yourself about energy and about energy education for two purposes: first, to be an effective advocate for energy education, and second, to be an effective instructional leader.

With respect to your advocacy role, I suggest that you get a copy of Energy Education: Why, What and How, available at no cost, from the State Energy Education Project, Education Commission of the States, 1860 Lincoln, Suite 300, Denver, Colorado 80295. Based on suggestions from our task force, Paul Bauman and I designed this short and rather simplified publication to convince education policymakers of the importance of energy education and the feasibility of incorporating energy concerns into the

elementary/secondary school curriculum. Its three sections explain the importance of energy education, set forth the six basic objectives I listed a moment earlier, and provide suggestions for implementing energy education programs at relatively low cost. In addition, the booklet provides a list of organizations and agencies able to provide free or low-cost materials.

With respect to your role as an instructional leader, I urge you to learn about energy issues and to encourage your teachers to learn as much as they can about the energy-related content appropriate to their subject areas and grade levels. You must help your staff to move beyond the emotional and preconceived perspectives in a subject as complex and polarized as energy issues. You must also be informed about the current status of federal and state policies and programs addressing energy and education. Your personal involvement in the energy learning process should serve as a model to stimulate your staff and students to do likewise.

Second, Maintain a Long-range Perspective.

Because you are involved with education, you are not only concerned with your lifespan but also with the lifespan of present and future generations. Your responsibility is to prepare students to face an unknown future, equipped with the tools of critical thinking, decisionmaking, and flexibility. You want to enable them to exercise some control over their lives so that they are not continually the victims of a series of crises. This mission requires facing our energy uncertainties as they relate to the supply, development and utilization of renewable and nonrenewable energy sources and the environmental, social, economic and political implications of the choices before us.

Third, Do Not Fall Victim to a "Crisis Mentality."

The issue is not whether or not energy is a crisis. The facts that life depends upon energy, energy use patterns largely determine human lifestyles, and the distribution of energy resources affects economic and political relationships make energy important enough to be a part of the school curriculum. The pervasive importance of energy, however, does not mean that it must be pitted against such other curricular topics as health, career and consumer education for a spot in the curriculum. If schools are to assist students to function in their world, then there must be room for content that provides students with their needed tools. Part of the ongoing curricular adjustment process must be to keep educational programs synchronized with societal needs.

Fourth, Participate in the Political Process.

To be an effective advocate for energy education, you must be willing to participate in the political process. Play a role in the selection of candidates so that persons elected to public office will share your belief in energy and education as issues worthy of public attention. Tell public officials about energy and education needs in order to influence the determination of public priorities and budget allocations. And, work to develop a policy basis for energy education. Not only can a policy indicate a high level of official commitment to the goals and objectives of energy education, but it also can provide the basis for appropriate support and assistance.[14]

To be effective, however, your involvement in the political process must be realistic, taking into account the current fiscal situation and the impending realignment of functions among federal, state and local units of government. We can no longer expect the federal government to provide the primary leadership in energy education. Instead, education decisionmakers at the state and local levels must assume the responsibility for an energy literate society, capable of enlightened decisionmaking.

Finally, I'd like to share with you the five implementation guidelines described in Energy Education: Why, What and How.

Guideline 1: Cost-Effectiveness

As explained in our publication,

> Limited federal and state support for program development combined with school districts' tight budgets necessitates the use of cost-saving methods and techniques whenever possible. Therefore, an energy education program must be developed as economically as possible while maintaining quality standards. Existing resources, information and expertise should be located and used whenever they are relevant and appropriate, thus avoiding duplication of effort and unnecessary expenditures.[15]

Your teachers do not have to develop their own curriculums.

Guideline 2: Curricular Considerations

A comprehensive energy education program must be carefully planned with respect to scope, sequence and instructional strategy. Most energy education programs have been designed to be infused into existing classes. In many cases it may be sufficient merely to

emphasize the energy-related content already present in a given class. A third approach is the building of an interdisciplinary curriculum around an energy theme. A fourth strategy, less appropriate for elementary grades, is the development of separate courses designed to address energy issues in greater detail or to provide students with vocational training.

Guideline 3: Objectivity

Again, quoting from Energy Education: Why, What and How,

> In order to be truly valuable and useful, an energy education program must be objective and impartial. It must be designed to provide factual information enabling people to draw their own conclusions and to make more informed decisions regarding energy questions and issues. . . .
>
> In developing and selecting programs, it is important to include a coalition of teachers, school administrators, industry representatives, parents, students and community leaders. . . . In this way a greater diversity of technical and policy options can be considered, and the concerns of individuals and organizations having different viewpoints will not be overlooked.[16]

Guideline 4: Relevance

By focusing on local, state and regional concerns, students can gain a very personal understanding of their dependence upon energy and of the issues which they can help to resolve.

Guideline 5: Teacher Preparation and Participation

The fifth and final implementation guideline is the need for teacher preparation and participation. Teachers must become knowledgeable about energy concepts in order to address them effectively in the classroom. Energy literacy can result from preservice training, inservice programs and individual initiative. Responsibility for teacher preparation must be shared among colleges and universities, state and local education agencies, school administrators and individual classroom teachers.

Closely related to teacher preparation is the importance of teacher participation in determining both broad and operational energy education objectives, selecting and/or developing appropriate materials, and implementing school energy education programs.

My concluding observation is that energy education is now at the threshold of what may be its decline or its affirmation. If you

believe that energy has an important place in the classroom, then you must work to make this possible by articulating your commitment to those public officials who are now making some profound decisions that will affect energy education for years to come. You must also provide guidance to the private sector so that their energy education activities will meet identified public needs and will be processed through proper channels of education governance.

Remember, our energy future is in your hands. The quality of life of future generations will depend on the decisions they will make, with your help and preparation. Therefore, you must continue to augment your energy knowledge and to find creative and appropriate ways to help teachers bring energy issues into the classroom.

FOOTNOTES

1. Doris Ross, Education's Response to the Energy Crisis: A Survey of the States, Research Brief Vol. 2, No. 1 (Denver: ECS, February 1974).

2. National Assessment of Educational Progress, Energy Knowledge and Attitudes, Report No. 08-E-1 (Denver: ECS, December 1978).

3. Energy Information Associates, The Status of State Energy Education Policy, Report No. 122 (Denver: ECS, March 1979).

4. Gary Smith, Building An Interstate Energy and Education Network: A Conference Report (Denver: ECS, June 1979).

5. Gallup Poll, "Energy Shortage 'Critical' to 1 in 4," June 6, 1977; Gallup Poll, "Few Fully Informed on Energy Problems," May 1, 1977; Gallup Poll, "Majority Still Uninformed on Extent of Energy Crisis," April 30, 1978; Cambridge Reports, Inc., Poll for the Alliance to Save Energy, Summer 1978; and others.

6. National Assessment of Educational Progress, op. cit.

7. William Tucker, "The Energy Crisis Is Over," Harper's, November 1981, p. 36.

8. "Reagan Unveils New Energy Policy Plan," Science News, Vol. 120, p. 68.

9. "State & Local Government in Trouble: A Special Report" Business Week, October 26, 1981, pp. 135-181.

10. "Energy Crisis Seen Despite Oil Abundance," Rocky Mountain News, March 12, 1982, p. 52.

11. Edith Petrock, Energy Education: A Policy Development Handbook, Report No. 142 (Denver: ECS, August 1981), p. 3.

12. For a comprehensive discussion of six energy education objectives, see Paul Bauman and Edith Petrock, Energy Education: Why, What and How? Report No. 181-1 (Denver: ECS, October 1981).

13. Michael Cohen, "Effective Schools: What the Research Says," Today's Education, April-May 1981, p. 59.

14. See Energy Education: A Policy Development Handbook for an explanation of the purpose of a policy foundation, a suggested policy development and implementation process, and important issues to be considered in developing energy education policies and programs.

15. Energy Education: Why, What and How? p. 15.

16. Ibid., p. 18.